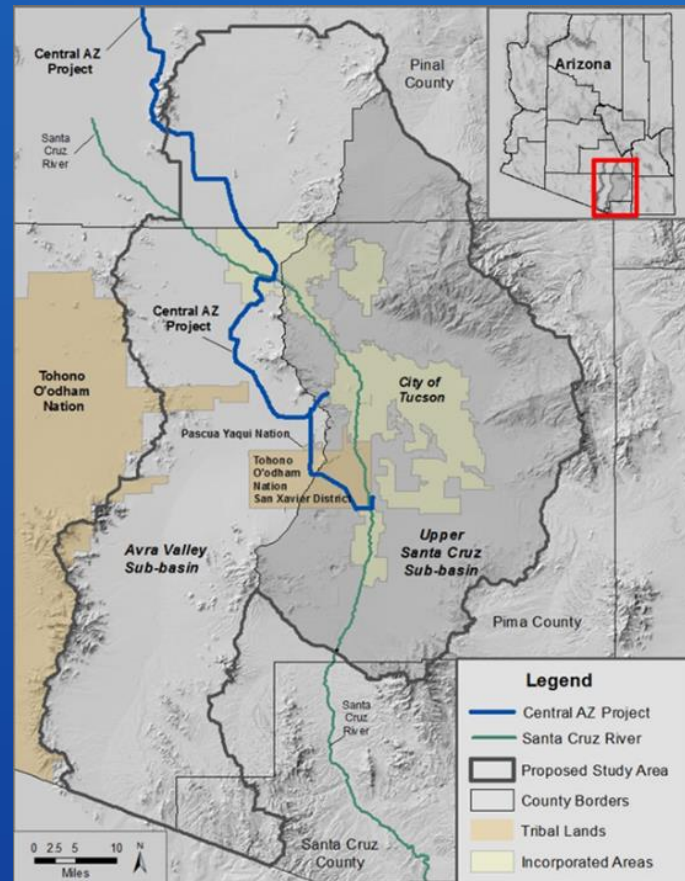


Lower Santa Cruz River Basin Study:

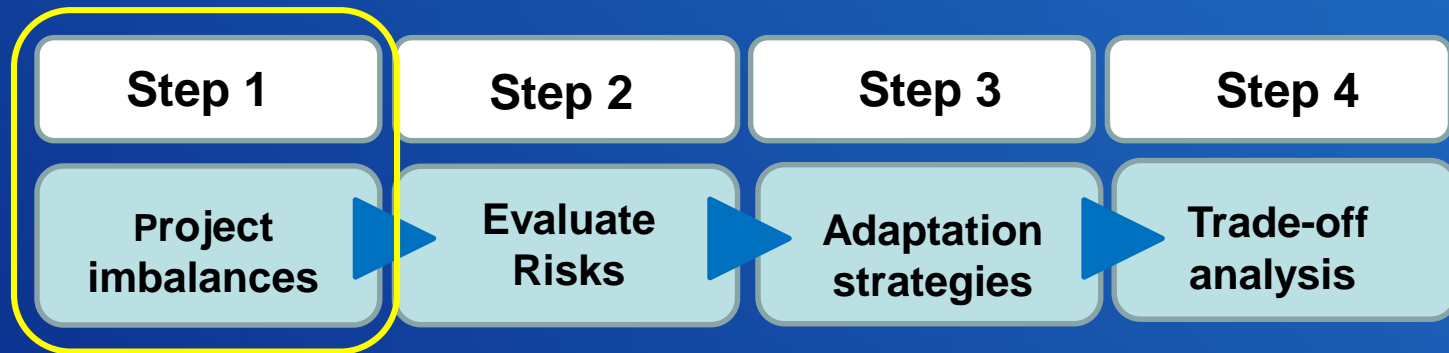
Study Progress, Review of Modeling Framework and Next Steps

*Eve Halper
Water Resources Planner
Bureau of Reclamation
Project Team Meeting #8
April 2, 2018*

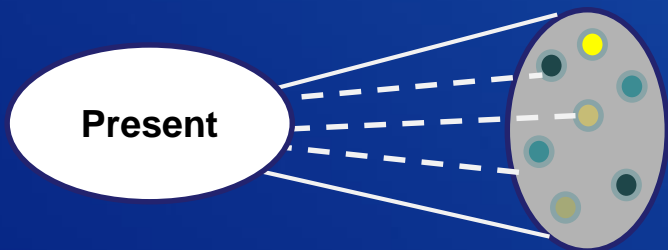


RECLAMATION

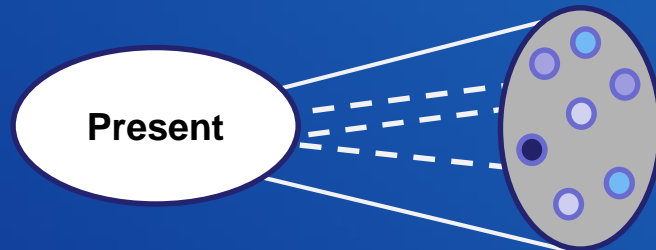
Study Process Overview



Future without
Additional Adaptation



Future with
Additional Adaptation



Benefits and Costs

RECLAMATION

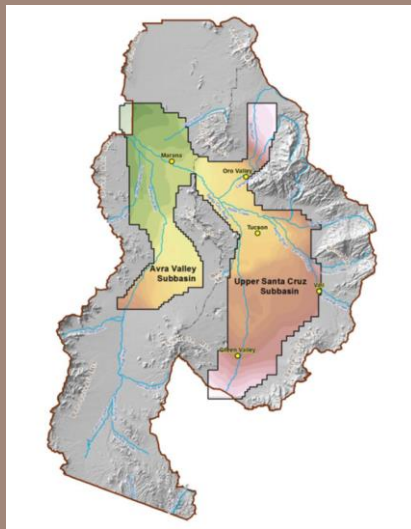
Simplified Modeling Overview

Tucson AMA Groundwater Model

Climate Driving Forces
(Precipitation, Temperature)

GLOBAL CLIMATE MODELS

SURFACE HYDROLOGY MODEL

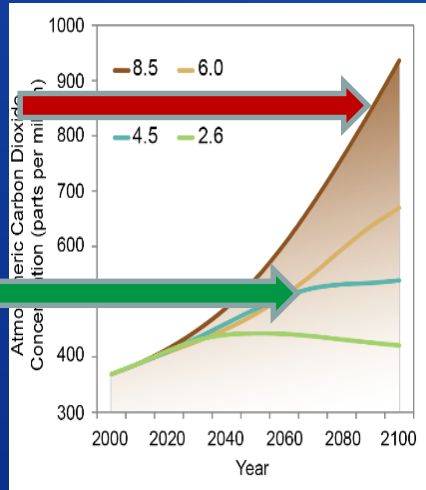


Socio-Economic Driving Forces
(Demographics, Economics, Technological, Regulatory)

CAP SERVICE AREA MODEL

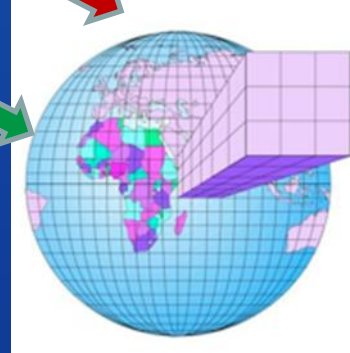
RECLAMATION

Best Case / Lower Risk

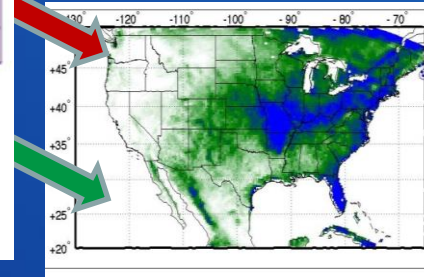


Emissions Scenarios

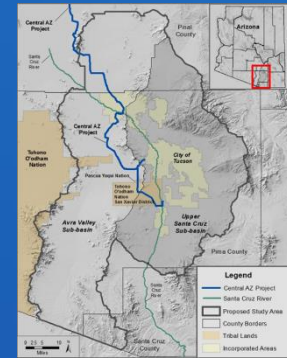
Which GCM(s) and Downscaling Method(s) are appropriate for our Study?



Global Climate Model (GCM)



Downscaled Climate Projection



Basin Climate

T, P

Now

2060

T, P

Now

2060

LSCR Basin Study Climate Modeling Detail

RECLAMATION

Development of Climate Metrics of Concern

- All Teams Climate Metrics Webinar held on 12/1/2017
- Metrics suggested by partners and sub-team members:
 - Winter versus summer precipitation
 - Monsoon precipitation, especially time of onset
 - Length of pre-monsoon dry season
 - Frequency of intense winter storm events
 - Intensity of precipitation
 - Extreme temperatures
 - Seasonal evaporation rates
 - Length and timing of winter freeze
 - Ability to reproduce spatial variability within the basin
 - Effects of atmospheric rivers



RECLAMATION

Development of Climate Metrics of Concern, con't

- From partner / stakeholder input, UA / Reclamation Technical Team selected 5 key metrics:
 - Average monthly precipitation (winter vs. summer precipitation)
 - Extreme precipitation events by month (precip intensity & frequency)
 - Extreme monthly temperatures
 - Date of Monsoon Onset
 - Date of Last Winter Storm
- Together these compose the length of the dry season*

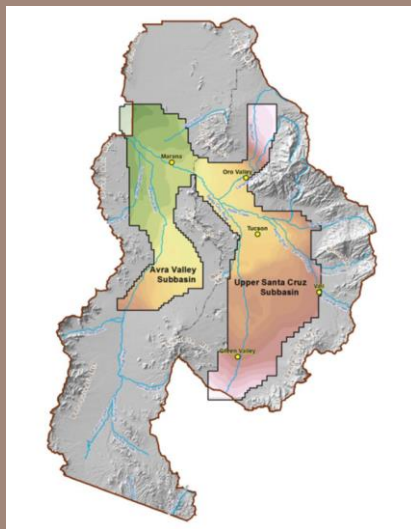
Simplified Modeling Overview Recap

Tucson AMA Groundwater Model

**Climate
Driving Forces**
(Precipitation,
Temperature)

**GLOBAL
CLIMATE
MODELS**

**SURFACE
HYDROLOGY
MODEL**



**Socio-Economic
Driving Forces**
(Demographics,
Economics,
Technological,
Regulatory)

**CAP SERVICE
AREA MODEL**

RECLAMATION

CAP:SAM to Groundwater Model Detail

[illegible]

Demand Scenario

CAP Service Area Model

Demand Scenario X	
Water Provider	Total Demand per Unit Time
Tucson Water	Y(TW)
Metro Water	Y(Metro)
Marana Water	Y(Marana)

Demand Scenario X – Example: Metro Water		
Total Demand per Unit Time	Well A	Well B
Period 1	A1	B1
Period 2	A2	B2
Period 3	A3	B3

This step is performed by water providers within the Demand Sub-teams

RECLAMATION

Next Steps - Climate

- Complete Evaluation of Climate Models for Best Case / Lower Risk and Worse Case / Higher Risk Emissions Scenarios
- UA / Reclamation Technical Team will recommend the downscaled projections to use for each case to Project Team
- Project Team can approve selection or ask for modifications

Next Steps – CAP:SAM Results

- When the combinations of climate and demand scenarios have been selected, CAP staff will complete CAP:SAM model runs and provide total demand values through time to water providers
- As part of the demand sub-teams' activities, water providers will develop information on which wells would be pumped through time given the demand projected by the CAP:SAM
- This information will be provided to a groundwater modeler in Reclamation's Technical Service Center for input into the Tucson Active Management Area Groundwater Model

Update on Time Extension / Budget Request

- Reclamation's Lower Colorado Regional Director approved request
- Memo has been forwarded to Reclamation's Policy Office
- No word on when a response will be received

Questions?

RECLAMATION